

Install Downhole Separator Pumps



Partner Reported Opportunities (PROs)
for Reducing Methane Emissions

PRO Fact Sheet No. 705

Applicable sector(s):

☒ Production ☐ Processing ☐ Transmission and Distribution

Partners reporting this PRO: Marathon Oil Company

Other related PROs: Use Foaming Agents, Install Velocity Tubing Strings, Install Plunger Lift System on Gas Wells, Install Pumpjacks on Low Water Production Gas Wells

Compressors/Engines ☐
Dehydrators ☐
Pipelines ☐
Pneumatics/Controls ☐
Tanks ☐
Valves ☐
Wells ☒
Other ☐

Technology/Practice Overview

Description

Surface separation of water through gas-liquid separator vessels can lead to significant methane emissions. Water is typically stored in fixed roof tanks where methane gas escapes from solution and vents to the atmosphere. One partner has reported reducing emissions by installing downhole separator pumps in their gas production wells.

Downhole separator pumps, or hydrocyclones, separate gas from water below the surface, reinjecting the water into a lower lying disposal aquifer and sending the methane to the surface. The hydrocyclones have no moving parts, which makes them simple to maintain and relatively immune to mechanical failure. Downhole separators minimize the amount of water with dissolved methane that must be handled in surface facilities, thus reducing methane emissions.

Operating Requirements

A downhole separator can be installed upon well completion or during a workover. Existing production tubing must be removed. A lower lying water disposal aquifer is required for downhole separation.

Applicability

Wells requiring gas-liquid separation, and with minimal solids and liquid hydrocarbon production are excellent candidates for downhole separator pumps.

Methane Savings: 400 Mcf per year

Costs

Capital Costs (including installation)

☐ <\$1,000 ☐ \$1,000 – \$10,000 ☒ >\$10,000

Operating and Maintenance Costs (annual)

☐ <\$100 ☒ \$100-\$1,000 ☐ >\$1,000

Payback (Years)

☐ 0–1 ☐ 1–3 ☒ 3–10 ☐ >10

Benefits

Reducing methane emissions was an associated benefit of the project.

Methane Emissions Reductions

Reported methane emissions reductions are based on eliminating a portion of the gas emitted from produced water storage. The glycol dehydration unit is not affected. Partners report savings of 150 to 750 Mcf per year.

Economic Analysis

Basis for Costs and Savings

Methane emissions reductions of 400 Mcf per year apply to eliminating the volume of gas vented from a produced water storage tank for 100 Mcf per day gas production.

Discussion

The primary benefit for the project is to reduce the operating cost of reinjection or disposal of produced water. Methane savings do not add to revenue, as the gas remains dissolved in the water phase.